

HVD Series 105°C Low Impedance Long life SMD Aluminum Electrolytic Capacitor

Extra lower impedance with temperature range -55~+105 °C

Load life of 2000~5000 hours

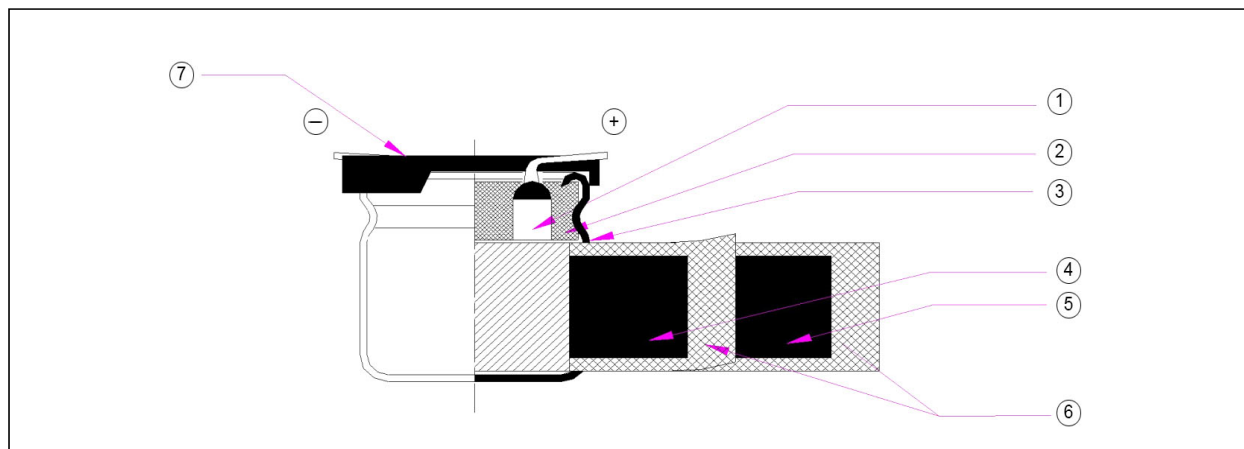
RoHS & REACH compliant, Halogen-free



How to order

<u>HVD</u>	<u>106</u>	<u>M</u>	<u>0016</u>	<u>0605</u>	<u>R</u>	<u>-</u>
↓	↓	↓	↓	↓	↓	↓
Type	Capacitance code	Tolerance	Rated Voltage	Size Code	Package	Additional characters may be added for special requirements
HVD	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10uF 476 = 47uF	M: +/-20%	Code 0035: 35VDC For DC Voltage 0016: 16VDC 0025: 25VDC 0050: 50VDC	Code 0405: Size 4x5.4mm Size for V-chip E-cap 0605: Size 6x5.4mm 1010: Size 10x10.5mm 1818: Size 18x18.5mm	R: Tape & Reel	

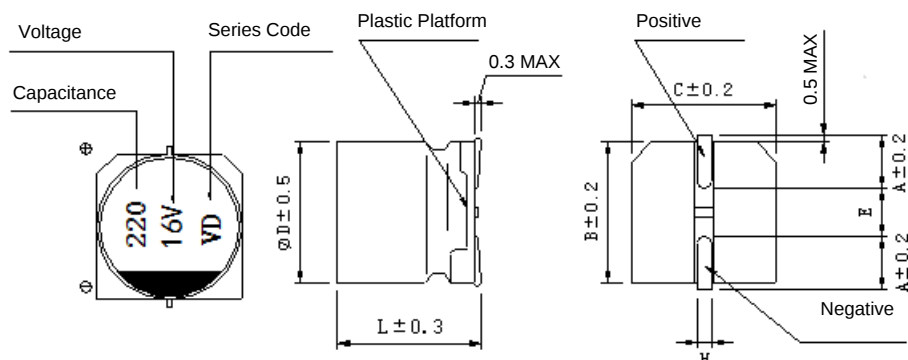
Frame drawing and materials



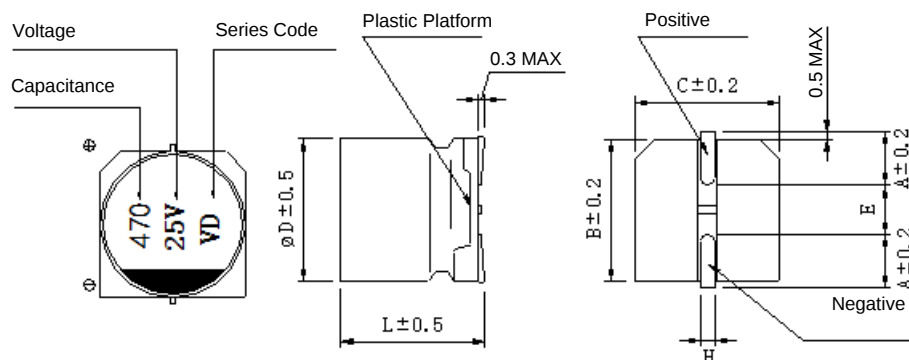
No.	Parts	Material
1	Lead wire	AL- wire LG3+Tin- plating of copper cover steel
2	Rubber stopper	IIR rubber
3	PE- CASE	AL -99.5%
4	AL – foil(+)	Formed AL 99.98% or 99.98%
5	AL – foil(-)	Etched AL 99.7%
6	Separstor paper	Electrolytic Capacitor paper
7	BASE	PPS

Case size table

1. $\phi 4 \sim \phi 6.3$



2. $\phi 8 \sim \phi 18$



unit:mm

	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 7.7	6.3 × 10.5	8 × 10.5	8 × 12.5	10 × 10.5	10 × 12.5	12.5 × 13.5	12.5 × 16.5	16 × 16.5	18 × 16.5	18 × 21.5
A	1.8	2.1	2.4	2.4	2.4	2.9	2.9	3.2	3.2	4.8	4.8	5.8	6.8	6.8
B	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3	10.3	13	13	17	19	19
C	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3	10.3	13	13	17	19	19
E	1.0	1.3	2.2	2.2	2.2	3.1	3.1	4.5	4.5	4.4	4.4	6.4	6.4	6.4
L	5.4	5.4	5.4	7.7	10.5	10.5	12.5	10.5	12.5	13.5	16.5	16.5	16.5	21.5
H	0.5~0.8					0.8 ~ 1.1					1.1~1.4			

Items	Characteristics						
Operating Temperature Range	-55℃ ~ 105℃						
Rated Voltage Range	6.3 V ~ 50V						
Nominal Capacitance Range	1 ~ 8200 μF						
Nominal Capacitance Tolerance	±20% (20℃, 120Hz)						
Leakage Current	$I \leq 0.01C_R V_R$ or 3(μA) Whichever is greater After 2 minutes' application of rated voltage. C_R : Nominal Capacitance (μF) U_R : Rated voltages (V)						
tgδ Dissipation Factor (Max) 20℃, 120Hz	U_R (V)	6.3	10	16	25	35	50
	tgδ	0.26(0.28)	0.20(0.24)	0.16(0.20)	0.14(0.16)	0.12(0.14)	0.12(0.14)
	When nominal capacitance exceeds 1000uF,add 0.02 to the value above for each 1000uF increase.						

Nominal capacitance, rated voltage, rated ripple current and case size table

V	6.3			10			16			25			35			50		
μF	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA
1.0																4×5.4	5.00	30
2.2																4×5.4	5.00	30
3.3																4×5.4	5.00	30
4.7													4×5.4	1.8	80	5×5.4	1.52	85
10										4×5.4	1.80	80	5×5.4	0.76	150	6.3×5.4	0.88	165
15							4×5.4	1.80	80	5×5.4	0.76	150	5×5.4	0.76	150	6.3×5.4	0.88	165
22				4×5.4	1.80	80	5×5.4	0.76	80	5×5.4	0.76	80	5×5.4	0.76	80	6.3×5.4	0.88	165
27	4×5.4	1.80	80	5×5.4	0.76	150	5×5.4	0.76	150	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.68	185
33	5×5.4	0.76	150	5×5.4	0.76	150	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.68	185
47	5×5.4	0.76	150	6.3×5.4	0.44	230	5×5.4	0.76	150	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.68	185
56	5×5.4	0.76	150	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.34	280	8×10.5	0.34	300
68	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.34	280	8×10.5	0.34	300
100	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.34	280	6.3×7.7	0.34	280	8×10.5	0.34	300
													8×10.5	0.17	300			
150	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.34	280	8×10.5	0.17	450	8×10.5	0.17	450	10×10.5	0.18	550
220	6.3×5.4	0.44	230	6.3×5.4	0.44	230	6.3×7.7	0.34	280	8×10.5	0.17	450	8×10.5	0.17	450	10×10.5	0.18	550
				6.3×7.7	0.34	280												
330	6.3×7.7	0.34	280	8×10.5	0.17	450	8×10.5	0.17	450	8×10.5	0.17	450	10×10.5	0.09	670	10×10.5	0.18	550
470	8×10.5	0.17	450	8×10.5	0.17	450	10×10.5	0.09	670	10×10.5	0.09	670	10×10.5	0.09	670	12.5×13.5	0.12	650
680	8×10.5	0.17	450	10×10.5	0.09	670	10×10.5	0.09	670	10×10.5	0.09	670	12.5×13.5	0.07	820	16×16.5	0.073	1000
1000	8×10.5	0.17	450	10×10.5	0.09	670	10×10.5	0.09	670	12.5×13.5	0.07	820	16×16.5	0.054	1260	18×16.5	0.066	1500
1500	10×10.5	0.09	670	12.5×13.5	0.07	820	12.5×13.5	0.07	820	12.5×16.5	0.06	950	18×16.5	0.048	1500	18×21.5	0.05	1620
2200	12.5×13.5	0.07	820	12.5×16.5	0.06	950	12.5×16.5	0.06	950	16×16.5	0.054	1260	18×21.5	0.038	1750			
3300	12.5×16.5	0.06	950	16×16.5	0.054	1260	16×16.5	0.054	1260	18×21.5	0.038	1750						
4700	16×16.5	0.054	1260	16×16.5	0.054	1260	18×16.5	0.048	1500									
6800	18×16.5	0.048	1500	18×16.5	0.048	1500												
8200	18×21.5	0.038	1750	18×21.5	0.038	1750												

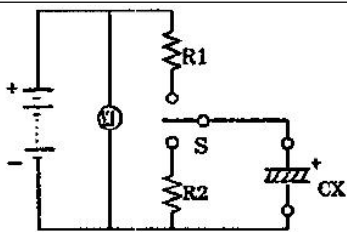
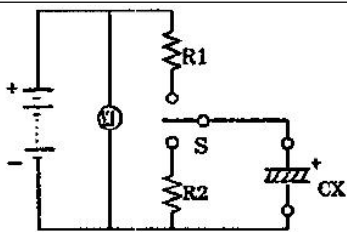
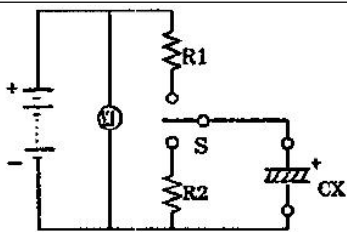
→ I=Rated ripple current (mA) (105°C, 100KHz)
→ 20°C 100KHz (Ω) MAX

Frequency coefficient of ripple current

Frequency	50Hz	120Hz	300Hz	1KHz	≥10KHz
Coefficient	0.35	0.50	0.64	0.83	1.00

Tests

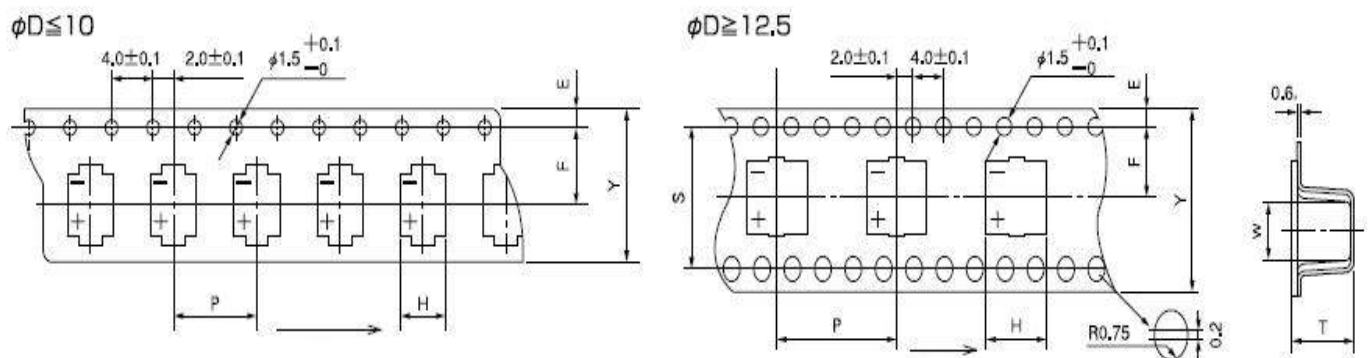
1	SERIES	HVD SERIES																								
2	Rated voltage	6.3~50V																								
3	Operating temperature range operating	Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage SPEC:-55~+105℃																								
4	Capacitance	Measuring circuit equivalent series circuit.																								
		20℃	measuring temperature																							
		120HZ	measuring frequency																							
		0.5Vrms	measuring voltage																							
		±20% MAX	Nominal Capacitance Tolerance:±20% MAX																							
5	Tangent of the loss angle	Measurement should be made under the same conditions as those given for the measurement of capacitance SPEC: <table><tr><td rowspan="2">tgδ</td><td>U_R (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tgδ</td><td>0.26</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td></tr></table>							tgδ	U _R (V)	6.3	10	16	25	35	50	tgδ	0.26	0.20	0.16	0.14	0.12	0.12			
tgδ	U _R (V)	6.3	10	16	25	35	50																			
	tgδ	0.26	0.20	0.16	0.14	0.12	0.12																			
6	Leakage current	The rated voltage shall be applied across the capacitor and its protective resistor which shall be 1000±100Ω.The leakage current shall be then measured after an electrifications period of (A)min. The leakage current shall be calculated by the following equation. I≤0.01CV or 3μA Which is greater. SPEC: The following specifications shall be satisfied when the rated voltage is applied for the required time.																								
7	Maximum permissible ripple current	The maximum sinusoidal alternating current of a frequency specified below, at which the capacitor can be operated continuously. This requirement shall be satisfied even after the measurement of clause 16(electrical endurance) Where(DC voltage +peak ripple voltage)≤rated voltage																								
8	Characteristics of temperature	<table><tr><td>Step</td><td>temperature</td><td>Duration</td></tr><tr><td>1</td><td>20±2℃</td><td>15 min</td></tr><tr><td>2</td><td>minimum operating temperature</td><td>2 hours</td></tr><tr><td>3</td><td>20±2℃</td><td>15 min</td></tr><tr><td>4</td><td>maximum operating temperature</td><td>2 hours</td></tr></table>						Step	temperature	Duration	1	20±2℃	15 min	2	minimum operating temperature	2 hours	3	20±2℃	15 min	4	maximum operating temperature	2 hours				
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3	20±2℃	15 min																								
4	maximum operating temperature	2 hours																								
		Step1: Capacitance, tangent of the loss angle impedance shall be measured. Step2: After the capacitor being stored for 2hours, Capacitance, tangent of the loss angle and impedance shall be measured. Step3: The capacitor being stored fro 15min at20±2℃ Step4 : After the capacitor being stored for 2hours, capacitance and leakage current shall be measured.																								
		<table><tr><td>Rated voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Z-(-25℃/Z (+20℃)</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z-(-40℃/Z (+20℃)</td><td>5</td><td>4</td><td>4</td><td>3</td><td>3</td></tr></table>						Rated voltage	6.3	10	16	25	35	Z-(-25℃/Z (+20℃)	3	2	2	2	2	Z-(-40℃/Z (+20℃)	5	4	4	3	3	
Rated voltage	6.3	10	16	25	35																					
Z-(-25℃/Z (+20℃)	3	2	2	2	2																					
Z-(-40℃/Z (+20℃)	5	4	4	3	3																					

9	Surge test	The capacitor shall be subjected to 1000cycles at a temperature specified below, each consisting of a charge period of 30±5sec, followed by a discharge period of approx. 5min30sec. And the capacitor shall be stored under standard conditions thermal to obtain stability,after which measurements shall be made. measurement circuit <table><tr><td></td><td>VS: Surge voltage</td><td>V1: DC voltmeter</td></tr><tr><td></td><td>R1: (1KΩ) Protective series resistor</td><td>R2: Discharge resistor</td></tr><tr><td></td><td>CX: Test capacitor</td><td>S: Switch</td></tr></table> <table><tr><td>RATED VOLTAGE(V_{DC})</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>SURGE VOLTAGE(V_{DC})</td><td>8</td><td>13</td><td>20</td><td>32</td><td>44</td><td>63</td></tr></table>		VS: Surge voltage	V1: DC voltmeter		R1: (1KΩ) Protective series resistor	R2: Discharge resistor		CX: Test capacitor	S: Switch	RATED VOLTAGE(V _{DC})	6.3	10	16	25	35	50	SURGE VOLTAGE(V _{DC})	8	13	20	32	44	63
	VS: Surge voltage	V1: DC voltmeter																							
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RATED VOLTAGE(V _{DC})	6.3	10	16	25	35	50																			
SURGE VOLTAGE(V _{DC})	8	13	20	32	44	63																			
10	Terminal strength	1)Tensile <table><tr><td>d(mm)</td><td>[N]</td><td>Duration time</td></tr><tr><td>0.3<d≤0.5</td><td>5</td><td rowspan="3">10±2sec</td></tr><tr><td>0.5<d≤0.8</td><td>10</td></tr><tr><td>0.8<d≤1.25</td><td>20</td></tr></table> 2)Bending The terminal shall be subjected to 1 bend in each direction to give a total 2 bends. <table><tr><td>d(mm)</td><td>[N]</td></tr><tr><td>0.3<d≤0.5</td><td>2.5 (0.25KG)</td></tr><tr><td>0.5<d≤0.8</td><td>5.0 (0.51KG)</td></tr><tr><td>0.8<d≤1.25</td><td>10.0(1.0KG)</td></tr></table> SPEC: No breaking and loosening of terminal	d(mm)	[N]	Duration time	0.3<d≤0.5	5	10±2sec	0.5<d≤0.8	10	0.8<d≤1.25	20	d(mm)	[N]	0.3<d≤0.5	2.5 (0.25KG)	0.5<d≤0.8	5.0 (0.51KG)	0.8<d≤1.25	10.0(1.0KG)					
d(mm)	[N]	Duration time																							
0.3<d≤0.5	5	10±2sec																							
0.5<d≤0.8	10																								
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0.5<d≤0.8	5.0 (0.51KG)																								
0.8<d≤1.25	10.0(1.0KG)																								
11	Solderability	Solder: H60A H60S or H63A Solder temperature: 245±2℃ Immersion time: 3±0.5sec Immersion depth: 2mm Flux: 25% by weight of rosin in ethanol SPEC:1) 3/4 of the circumference of the surface up to the immersed shall be covered with new solder.																							
12	Resistance to soldering heat	Solder) H60A. H60S or H63A Solder temperature: 260±5℃ or 350±10℃ Immersion time: 10±1sec or 3.5±0.5sec Thickness of heat shunt:1.6mm: 1.6mm SPEC:1) Change in capacitance: Within±10% of the initial value; 2) tangent of the loss angle: The initial specified value or less; 3) leakage current: The initial specified value or less.																							
13	Vibration	Only endurance conditioning by sweeping shall be made. The entire frequency range, from 10 to 55Hz and return to 10Hz, shall be transversed in 1min. Amplitude (total excursion) 1.5mm, This motion shall be applied for a period of 2hours in each of 3 mutually perpendicular directions(a total of 6 hours) SPEC:1) change in capacitance : within ±5% of the initial value; 2)No visible damage.																							

14	Damp heat	The capacitor shall be stored at a temperature of $40\pm 2^{\circ}\text{C}$ and relative humidity of 90 to 95% for 240 ± 8 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made. SPEC: 1) change in capacitance: within $\pm 15\%$ of the initial value; 2) tangent of loss angle: The initial specified value or less; 3) leakage current: The initial specified value or less.
15	Shelf life	The capacitor shall be stored at 105°C temperature specified below for 1000 hours. During which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made. Prior to the measurement of leakage current, following conditioning may be made. SPEC: 1) change in capacitance: within $\pm 30\%$ of the initial value; 2) tangent of loss angle: within $\pm 300\%$ of the initial value; 3) leakage current: The initial specified value or less.
16	Load life	$\Phi D=4, 5$ and 6.3: 2000H; $\Phi D=8, 10$: 5000H application of rated voltage at 105°C, the capacitor shall meet the following requirement. SPEC: 1) change in capacitance: within $\pm 30\%$ of the initial value; 2) tangent of loss angle: within $\pm 300\%$ of the initial value; 3) leakage current: The initial specified value or less.

SMD Aluminum Electrolytic Capacitors

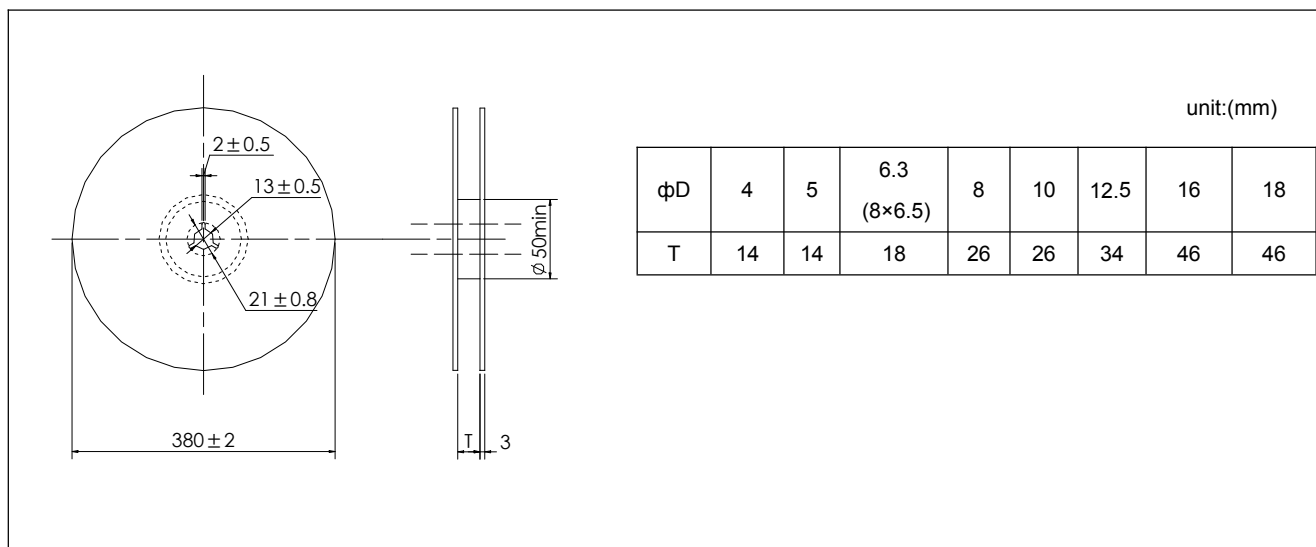
Carrier tape



unit:(mm)

$\Phi D \times L$	4×5.4	5×5.4	6.3× 5.4	6.3× 7.7	6.3× 10.5	8× 10.5	8× 12.5	10× 10.5	10× 12.5	12.5× 13.5	12.5× 16.5	16× 16.5	18× 16.5	18× 21.5
W	12.0	12.0	16.0	16.0	16.0	24.0	24.0	24.0	24.0	32.0	32.0	44.0	44.0	44.0
P	8.0	12.0	12.0	12.0	12.0	16.0	16.0	16.0	16.0	24.0	24.0	28.0	32.0	32.0
F	5.5	5.5	7.5	7.5	7.5	11.5	11.5	11.5	11.5	14.2	14.2	20.2	20.2	20.2
A ₀	5.0	6.0	7.0	7.0	7.0	8.7	8.7	10.7	10.7	13.2	13.2	17.5	19.5	19.5
B ₀	5.0	6.0	7.0	7.0	7.0	8.7	8.7	10.7	10.7	13.2	13.2	17.5	19.5	19.5
T ₂	5.8	5.8	5.8	8.0	11.0	11.0	13.3	11.0	13.3	14.3	17.3	17.3	17.8	22.5

Reel



Package quantity

$\phi D \times L$	Quantity / Reel	pcs/ Small packing box	pcs/Large packing box
4×5.4	2000pcs	24000pcs	48000pcs
5×5.4	1000pcs	12000pcs	24000pcs
6.3×5.4、6.3×7.7、8×6.5	1000pcs	10000pcs	20000pcs
8×10.5、10×10.5	500pcs	3500pcs	7000pcs
6.3×10.5	800pcs	8000pcs	16000pcs
8×12.5	400pcs	2800pcs	5600pcs
10×12.5	400pcs	2800pcs	5600pcs
12.5×13.5	250pcs	2500pcs	5000pcs
12.5×16.5	200pcs	800pcs	1600pcs
16×16.5	200pcs	800pcs	1600pcs
18×16.5	175pcs	700pcs	1400pcs
18×21.5	125pcs	500pcs	1000pcs